THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

ERIC C. PEARCE	:	**CIVIL ACTION NO.:**
	:	**1:05-cv-11694**
Plaintiff,	:	
	:	
v.	:	**JURY TRIAL DEMANDED**
	:	
KEITH BAUMM, ADVANCED COMPOSITE ENGINEERING D/B/A AEGIS BICYCLES, WYMAN-GORDON INVESTMENT CASTINGS, INC., STURM, RUGER & CO., INC AND UNI-CAST, INC.	:	
Defendants,	:	**AUGUST 15, 2008**

PLAINTIFF'S 26(a)(2) EXPERT DISCLOSURES

Pursuant to Fed. R. Civ. P. 26(a)(2), the plaintiff, Eric Pearce, through counsel, hereby discloses the following individuals who may be used at trial to present evidence under Rules 702, 703 or 705 of the Federal Rules of Evidence:

David F. Toler, P.E.
Forensic Engineering Sciences, Inc.
2586 Nazareth Road
P.O. Box 3938
Easton, PA 18043-3938

Mr. Toler is expected to testify in conformity with the attached report submitted pursuant to Fed. R. Civ. P. 26(a)(2)(B).

Dr. Brian L. Ting, DMD
Reicheld Family Orthodontics
73 Littleton Road
Westford, MA 01886

Dr. Ting is expected to testify regarding his examination and treatment of Plaintiff. It is expected that Dr. Ting will testify in accordance with his treatment notes and evaluation and consultation reports that have been previously provided through discovery. Evidence or testimony will include the nature and extent of the plaintiff's injuries, causation, prognosis and mitigation. It is expected

that Dr. Ting will testify that the injuries the Plaintiff suffered were directly related to the accident of June 29, 2004. Dr. Ting is expected to testify that his treatment of the plaintiff for injuries sustained in the June 29, 2004, accident, as more fully described in his medical reports and records, was both reasonable and necessary. Dr. Ting is also expected to testify regarding the future treatment and cost of treatment, if any, the plaintiff may have to undergo as a result of the June 29, 2004, accident. Dr. Ting's fees for expert services are $1,000.00 per hour. A copy of Dr. Ting's current Curriculum Vitae is attached hereto.

Dr. Sonal Pandya
Lahey Clinic
41 Mall Road
Burlington, MA 01805

Dr. Pandya is expected to testify regarding her examination and treatment of Plaintiff. It is expected that Dr. Pandya will testify in accordance with her treatment notes and evaluation and consultation reports that have been previously provided through discovery. Evidence or testimony will include the nature and extent of the plaintiff's injuries, causation, prognosis and mitigation. Dr. Pandya will testify that the injuries the Plaintiff suffered were directly related to the accident of June 29, 2004. Dr. Pandya is expected to testify that the treatment of the plaintiff for injuries sustained in the June 29, 2004, accident, as more fully described in the medical reports and records, was both reasonable and necessary. Dr. Pandya is also expected to testify regarding the future treatment and cost of treatment, if any, the plaintiff may have to undergo as a result of the June 29, 2004, accident. Dr. Pandya's fees for expert services are $300.00 per hour. Dr. Pandya's current Curriculum Vitae is attached hereto.

Dr. Eric Halvorsen
University of North Carolina School of Medicine
Division of Plastic and Reconstructive Surgery and Surgery of the Hand
7040 Burnett-Womack
CB # 7195
Chapel Hill, NC 27599-7195

Dr. Halvorson is expected to testify regarding his examination and treatment of Plaintiff. It is expected that Dr. Halvorson will testify in accordance with his treatment notes and evaluation and consultation reports that have been previously provided through discovery. Evidence or testimony will include the nature and extent of the plaintiff's injuries, causation, prognosis and mitigation. Dr. Halvorson will testify that the injuries the Plaintiff suffered were directly related to the accident of June 29, 2004. Dr. Halvorson is expected to testify that the plaintiff's treatment for injuries sustained in the June 29, 2004, accident, as more fully described in the medical reports and records, was both reasonable and necessary. Dr. Halvorson is also expected to testify regarding the future treatment and cost of treatment, if any, the plaintiff may have to undergo as a result of the June 29, 2004, accident. Dr. Halvorson's fees, as set by the University of North Carolina are $350.00 per

hour for consultation, review of records and correspondence and $600.00 per hour for Deposition or Trial testimony. Dr. Halvorson's current Curriculum Vitae is attached hereto.

The plaintiff reserves the right to supplement and amend this disclosure as necessary.

THE PLAINTIFF,

By: _____

Frank C. Bartlett, Jr.
Ouellette, Deganis & Gallagher, LLC
143 Main Street
Cheshire, CT 06410
Tele: (203)272-1157
Fax: (203) 250-1835
fbartlett@odglaw.com

THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

ERIC C. PEARCE	:	**CIVIL ACTION NO.:**
	:	**1:05-cv-11694**
Plaintiff,	:	
	:	
v.	:	**JURY TRIAL DEMANDED**
	:	
KEITH BAUMM,	:	
ADVANCED COMPOSITE	:	
ENGINEERING D/B/A	:	
AEGIS BICYCLES,	:	
WYMAN-GORDON INVESTMENT	:	
CASTINGS, INC.,	:	
STURM, RUGER & CO., INC AND	:	
UNI-CAST, INC.	:	
Defendants,	:	**AUGUST 15, 2008**

CERTIFICATION

I hereby certify that a copy of the foregoing was mailed electronically to the following counsel of record via operation of the Courts e-filing system and emailed directly to any attorney's not registered to receive e-filing notifications on August 15, 2008:

James D. Poliquin, Esq.
Norman, Hanson & DeTroy
P.O. Box 4600
415 Congress Street
Portland, ME 04112
jpoliquin@nhdlaw.com

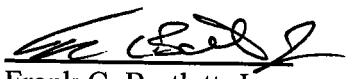
William J. Dailey, Jr.
Brian H. Sullivan
Sloan & Walsh
3 Center Plaza
Boston, MA 02108
wdaileyjr@sloanewalsh.com
bsullivan@sloanewalsh.com

Christopher A. Callan
Richard Edwards
Campbell, Edwards & Conroy
One Constitution Plaza
Third Floor
Boston, MA 02129
ccallanan@campbell-trial-lawyers.com
redwards@campbell-trial-lawyers.com

Terrance J. Hamilton
Casner & Edwards, LLP
303 Congress Street
Boston, MA 02210
tjhamilton@casneredwards.com

James B. Vogts
Wildman, Harrold, Allen & Dixon
225 West Wacker Drive
Chicago, IL 60606-1229
vogts@wildman.com

Anthony S. Augeri
Devine, Millimet & Branch, PA
300 Brickstone Sq., 9th Fl., P.O. Box 39
Andover, MA 01810
aaugeri@devinemillimet.com

By: 

Frank C. Bartlett, Jr.
Ouellette, Deganis & Gallagher, LLC
143 Main Street, Cheshire, CT 06410
(203) 272-1157
fbartlett@odglaw.com

BRIAN L. TING D.M.D.

14 Hadley Road
Pepperell, MA 01463
email : bmtingus@yahoo.com

EDUCATION

Tufts University School of Dental Medicine Boston, MA
Certificate in Orthodontics - June 2003
Chief Orthodontic Resident- 2002-3

Tufts University School of Dental Medicine Boston, MA D.M.D. ***Summa Cum Laude*** **May 2001**
Honors/Scholarships
- *Valedictorian of Class 2001*
- David G. Stahl Alumni Award for Highest Academic Performance in Dental School (2001)
- Outstanding Senior Omicron Kappa Upsilon (OKU) Alumni Member (2001)
- National Boards Honors for Highest National Averages on Part I and Part II
- Alpha Omega Highest Academic Achievement Graduating Student Award (2001)
- American Academy of Dental Practice Adminstration Award (2001)
- American Association of Orthodontics Award (2001)
- Jack Frommer Award for Excellence in the Anatomical Sciences (2001)
- Tufts-Middlesex Community College Clinical Honors Program (2000)
- Omicron Kappa Upsilon (OKU) Basic Science Award (2000)
- Omicron Kappa Upsilon (OKU) William S. Kramer Award of Excellence (2000)
- Merit Scholarship 1998, 1999, 2000, & 2001 of Dental School
- John "Jack" Hein Alumni Award for Academic Performance for First Year of Dental School (1999)
- ADA/Dentsply Student Clinician Award chosen to present at ADA meeting in Hawaii (1999)
- ADA Endowment Fund Scholarship (1998)
- Tufts Summer Research Fellowship (1998)

Professional Affiliations
- American Association of Orthodontics
- Omicron Kappa Upsilon (OKU) National Honor Society inductee
- Robert R. Andrews Research Honors Society
- SCADA (International Association of Student Clinicians-ADA) Associate
- ASDA/ADA member
- Massachusetts Dental Society member

Licensure/Certifications
- Commonwealth of Massachusetts
- National Board of Dental Examiners Part I
- National Board of Dental Examiners Part II
- Northeast Regional Board of Dental Examiners
- The Invisalign System™ by Align Technology

Trinity College Hartford, CT B.S. with Honors in Biology, May 1996
- Honors: Faculty Honors received Spring 1995, Fall 1995, & Spring 1996.
- Honors Thesis: Chloroplast interactions with Mitochondrial functioning
- Alternate, Council for Undergraduate Research/National Science Foundation grant: Summer 1995

EMPLOYMENT

Partner/owner : **Reichheld Ting Orthodontics** Westford, MA
Part- Time Operative Dental Faculty : **Tufts University School of Dental Medicine** Boston, MA 2001-2003
Part-Time General Dentist : **Dental Associates** Quincy, MA 2001- 2002
Dental Assistant : **RDH TEMPS, INC.** - Dennis , MA 2000-2001
Research Assistant : **Forsyth Dental Center** -Boston, MA 1998 –1999
Research Assistant : **Boston Medical Center** - Whitaker Cardiovascular Institute - Boston, MA 1996- 1997
Research Assistant : **Trinity College** -Biology Department - Hartford, CT 1995
Teaching Assistant : **Trinity College** -Chemistry Department -Hartford, CT Spring 1996
Research Assistant : **Harvard Medical School** - Boston, MA Summer 1994

RESEARCH EXPERIENCE

Forsyth Dental Center/ Harvard School of Dental Medicine - Boston, MA
Research Assistant: 1998-1999

- Designed and implemented Experimental Gingivitis Study
- Studied the oral microbiota, GCF, Bleeding, plaque and gingival indices of volunteers
- Samples were taken from volunteers before, during and after experimental gingivitis period using DNA-DNA checkerboard hybridization technique developed by Socransky et al. (1994)
- Results suggest a progressive oral microbiota shift from proposed endogenous orange complex species towards pathogenic red complex species

Boston University Medical Campus - Whitaker Cardiovascular Institute - Boston, MA
Research Assistant: 1996- 1997

- Studied the direct release of NO and oxygen consumption during platelet aggregation via ion selective probe
- Attempted to elucidate the role of antioxidants and NO release by platelets on ischemic coronary events
- Conducted measurements of superoxide radicals via chemiluminesce
- Utilized a knockout mouse model to identify NO role in vascular homeostasis

Trinity College - Biology Department - Hartford, CT
Honors Thesis Independent Research: 1995 - 1996

- Conducted alternate oxidase assays using O_2 monitor to measure oxygen consumption
- Presented thesis research to biology faculty and peers for evaluation throughout year
- Completed written thesis for honors in biology

Research Assistant: Summer 1995

- Recipient of highly selective Trinity Undergraduate Research Grant
- Conducted fatty acid analysis on tobacco chloroplast mutant using Gas Chromatography
- Performed chloroplast protein extraction, separation, and detection using PAGE & ELISA techniques

Trinity College - Chemistry Department - Hartford, CT
Teaching Assistant: Spring 1996

- Supervised both classroom and laboratory sections of analytical chemistry
- Supervised and assisted students with GC, HPLC, and all related laboratory equipment and supplies
- Held bi-weekly tutor sessions to facilitate learning of analytical chemistry foundations in classroom

Harvard Medical School - Molecular & Cellular Physiology Department - Boston, MA
Research Assistant: Summer 1994

- Conducted optimization experiment for in-vitro RNA transcription
- Isolated protein associated splicing complexes of pre-mRNA using a two-step purification method (splicing gels & fractionation columns)
- Performed general laboratory tasks such as ordering supplies and keeping accurate records

Publications

- Authored paper entitled "Impaired Platelet Production of Nitric Oxide Predicts Acute Coronary Syndromes" published in *Circulation* (1998; 98:1481-1486).
- Authored paper entitled "A Virescent Plastid Mutation in Tobacco Decreases Peroxisome Enzyme Activities in Seedlings" published in *Journal of Plant Physiology* (vol. 149, pp.520-526).

INTEREST / HOBBIES

- Soccer, water-skiing, snow skiing, tennis
- Home remodeling, woodworking, electronics, engineering

REFERENCES AVAILABLE UPON REQUEST

Eric Glenn Halvorson, MD

Assistant Professor
Division of Plastic and Reconstructive Surgery
University of North Carolina
Chapel Hill, NC 27599-7195
(919) 966-4446
eric_halvorson@med.unc.edu

ACADEMIC APPOINTMENT

Sept. '06 – present	Assistant Professor Director of Microsurgery (Sept. '07) Division of Plastic and Reconstructive Surgery Department of Surgery The University of North Carolina at Chapel Hill

TRAINING

Microsurgery:	Memorial Sloan-Kettering Cancer Center, New York, NY 2005-2006
Plastic Surgery:	Lahey Clinic, Burlington, MA 2003 – 2005
General Surgery:	Brown University / Rhode Island Hospital, Providence, RI 1998 – 2003

EDUCATION

M.D., Duke University School of Medicine, Durham, NC - May, 1998

B.A., Bates College, Lewiston, ME - June, 1992

AWARDS & HONORS

Resident Teaching Award, UNC Division of Plastic & Reconstructive Surgery, 2008
Outstanding Chief Resident Award, Brown University Department of Surgery,

2003
Dean's Teaching Excellence Award, Brown University School of Medicine, 2002
Humanitarian Award, Brown University Department of Surgery, 2001
Senior Scholarship, Duke University School of Medicine, 1998
Pomeroy Scholarship for Alumni in Health Sciences, Bates College, 1998
Dean's List, Duke University School of Medicine, 1997
Beta Beta Beta, Upsala College, 1993
Cum Laude, Honors in Religion, Bates College, 1992
Phi Beta Kappa, Bates College, 1992

BOARD CERTIFICATION

American Board of Plastic Surgery – November, 2007 - Certificate # 7257
American Board of Surgery – December, 2004 - Certificate # 49753

LICENSURE

North Carolina: Full License # 2006-00765
New York: Full License # 235284-1 (Expired)
Massachusetts: Limited and Full Licenses (Expired)
Rhode Island: Limited License (Expired)

PROFESSIONAL MEMBERSHIPS

Active Member, American Society of Plastic Surgeons, 2008-present
Candidate for Membership, American Society of Plastic Surgeons, 2006-2008
Residents and Fellows Forum, American Society of Plastic Surgeons, 2004-2006
Southeastern Society of Plastic and Reconstructive Surgeons, 2008-present
North Carolina Society of Plastic Surgeons, 2008-present
Candidate Member, American Society for Reconstructive Microsurgery, 2007-present
North Carolina Medical Society, 2007-present
Associate Fellow, American College of Surgeons, 2003-present
Resident Member, Northeastern Society of Plastic Surgeons, 2005-2006
Massachusetts Medical Society, 2003-2005

COMMITTEES

Member, Clinical Research Program, UNC Lineberger Comprehensive Cancer Center

Surgical Operations Task Force – UNC Hospitals – January '07-present
Member, Student Curriculum Committee, Duke University School of Medicine, Fall 1994 – Spring 1998.
Student Representative, Faculty Curriculum Committee, Duke University School of Medicine, Fall 1994.

CHAPTERS

Halvorson, EG, and Cordeiro, PG. Maxilla and Midface Reconstruction. Plastic Surgery. Guyuron, B, Persing, J, Eriksson, E, et al., Eds. Elsevier Publishers, Inc., London, 2008.

Halvorson, EG and Disa, JJ. Reconstruction of the Posterior Trunk. Plastic Surgery Secrets, 2nd edition. Weinzweig, J, Ed. Hanley & Belfus, Inc., Philadelphia, 2008.

Disa, JJ, Halvorson, EG, Shah, HR, and Kaplan, G. Surface Reconstruction Procedures. ACS Surgery: Principles and Practice. Souba, WW, Fink, MP, Jurkovich, GJ, et al., Eds. WebMD, Inc., New York, 2006.

Disa, JJ, Halvorson, EG, and Hidalgo, DA. Open Wound Requiring Reconstruction. ACS Surgery: Principles and Practice. Souba, WW, Fink, MP, Jurkovich, GJ, et al., Eds. WebMD, Inc., New York, 2006.

PUBLICATIONS

Halvorson, EG. Autologous vs. Autogenous. *Plast Reconstr Surg* (in press).

Halvorson, EG. A Simple Way to Locate Tissue Expander Injection Ports. *Plast Reconstr Surg* (in press).

Halvorson, EG, Avram, R, and Disa, JJ. The Lower Trapezius "Reverse Turnover" Flap. *Plast Reconstr Surg* 121: 45-6e, 2008.

Halvorson, EG and Mulliken, JB. Cheever's "Double Operation": The First Le Fort I Osteotomy. *Plast Reconstr Surg* 121: 1375-81, 2008.

Mehrara, BJ, Abood, AA, Disa, JJ, Pusic, AL, Halvorson, E, Cordeiro, PG, and

Athanasian, EA. Thumb Reconstruction following Resection for Malignant Tumors. *Plast Reconstr Surg* 121: 1279-87, 2008.

Halvorson, EG, Taylor, HOB, and Orgill, DP. Patency of the Descending Branch of the Lateral Circumflex Femoral Artery in Patients with Vascular Disease. *Plast Reconstr Surg* 121: 121-9, 2008.

Chen, C, Halvorson, EG, Hu, QY, Disa, JJ, and Mehrara, BJ. Immediate Postoperative Complications in DIEP vs. Free/Muscle Sparing TRAM Flaps. *Plast Reconstr Surg* 120: 1477-82, 2007.

Halvorson, EG, Disa, JJ, Mehrara, BJ, Burkey, BA, Pusic, AL, and Cordeiro, PG. Outcome Following Removal of Infected Tissue Expanders in Breast Reconstruction: A 10-year Experience. *Ann Plast Surg* 59:131-6, 2007; Abstract in *Plast Reconstr Surg* 120: 143-4, 2007.

Halvorson, EG and Cordeiro, PG. Go for the Jugular - A 10-year Experience with End-to-Side Anastomosis to the Internal Jugular Vein in 320 Head and Neck Free Flaps. *Ann Plast Surg* 59: 31-5, 2007.

Halvorson, EG Wound Irrigation in the E.R. – A Simple, Effective Method. *Plast Reconstr Surg* 119: 2345-6, 2007.

Halvorson, EG. A Cut Above (Biography of David Williams Cheever). *Harvard Medical Alumni Bulletin* Winter: 46-51, 2006.

Halvorson, EG, Pandya, SN, Husni, NR, and Seckel, BR. Optimal Parameters for Marking Upper Blepharoplasty Incisions: A 10-year Experience. *Ann Plast Surg* 56: 569-72, 2006.

Truitt, AK, Sorrells, DL, Halvorson, EG, Starring, J, Kurkchubasche, AG, Tracy, TF, Jr, and Luks, FI. Pulmonary Embolism: Which Pediatric Trauma Patients are at Risk? J Pediatr Surg 40: 124-7, 2005.

Kurkchubasche, A, Halvorson, EG, Forman, EN, Terek, RM, and Ferguson, WS. The Role of Preoperative Chemotherapy in the Treatment of Infantile Fibrosarcoma. *J Pediatr Surg* 35: 880-3, 2000.

PRESENTATIONS

Halvorson, EG, Disa, JJ, Mehrara, BJ, Burkey, BA, Pusic, AL, and Cordeiro, PG. Outcome Following Removal of Infected Tissue Expanders in Breast Reconstruction: A 10-year Experience.

- Poster at the Annual Meeting of the American Society of Plastic Surgeons, Baltimore, October 2007.

Halvorson, EG. CPT Coding in Reconstructive Plastic Surgery

- Presented at The 2nd Annual NC AAPC Coding Conference, Raleigh, September 2007.

Halvorson, EG, and Cordeiro, PG. End-to-Side Anastomosis to the Internal Jugular Vein: A 10-year Experience.

- Presented at the Annual Meeting of the American Society for Reconstructive Microsurgery, Los Angeles, January 2008.
- Poster at the Annual Meeting of the American Head & Neck Society, San Diego, April 2007.
- Presented at the Annual Meeting of the Northeastern Society of Plastic Surgeons, Boston, December 2006.

Halvorson, EG, Wallin, E, Disa, JJ, Cordeiro, PG, and Mehrara, BJ. Superficial Temporal Vessels as First Choice Recipients in Microvascular Orbit and Scalp Reconstruction.

- Poster at the Annual Meeting of the American Head & Neck Society, San Diego, April 2007.

Halvorson, EG, Taylor, HOB, and Orgill, DP. Patency of the Descending Branch of the Lateral Circumflex Femoral Artery in Patients with Vascular Disease.

- Presented at the Annual Meeting of the American Society for Reconstructive Microsurgery, Tucson, January 2006.
- Presented at Grand Rounds, Dept of Plastic Surgery, Brown University / Rhode Island Hospital, November 2005.

Halvorson, EG and Mulliken, JB. Cheever's "Double Operation": The First Le Fort I Osteotomy.

- Presented at the Annual Meeting of the New England Society of Plastic and Reconstructive Surgeons, Mystic, June 2005.

- Presented at Grand Rounds, Dept of Oral & Maxillofacial Surgery, Massachusetts General Hospital, March 2005.
- Presented at Grand Rounds, Dept of Plastic Surgery, Brown University / Rhode Island Hospital, November 2005.

Halvorson, EG, Pandya, SN, Husni, NR, and Seckel, BR. Optimal Parameters for Marking Upper Blepharoplasty Incisions: A 10-year Experience.

- Presented at the Annual Meeting of the Northeastern Society of Plastic Surgeons, Washington, DC, November 2005.
- Poster at Lahey Clinic Post-Graduation Recognition Day, June 2005.

Halvorson, EG, Vernadakis, AJ, Weinzweig, J. The EHL Flap Revisited: Case Report & Literature Review.

- Presented at the Annual Meeting of the New England Society of Plastic and Reconstructive Surgeons, Mystic, June 2005.

Halvorson, EG, Vernadakis, AJ. Adult Nasal Dermoid Cyst: Case Report & Literature Review.

- Poster at Lahey Clinic Post-Graduation Recognition Day, June 2005.

Kurkchubasche, A, Halvorson, EG, Forman, EN, Terek, RM, and Ferguson, WS. The Role of Preoperative Chemotherapy in the Treatment of Infantile Fibrosarcoma.

- Presented at the Annual Meeting of the Section on Surgery of the American Academy of Pediatrics, Washington, DC, October 1999.

IN PREPARATION

Halvorson, EG, Disa, JJ, Cordeiro, PG, Wallin, E, Pusic, A, and Mehrara, BJ. Superficial Temporal Recipient Vessels in Microvascular Orbit and Scalp Reconstruction of Oncologic Defects.

Abood, A, Halvorson, EG, Pusic, AL, and Mehrara, B. The Folded Anterolateral Thigh Flap for Closure of Pharyngo-cutaneous Fistulae [Case Report]. *Submission in progress.*

Halvorson, EG. On the Origins of "Components Separation".

Halvorson, EG, and Mulliken, JB. Theodore Dunham: The First Island Flap.

Halvorson, EG, and Cordeiro, PG. Umbilical Preservation on a Dermal Pedicle.

Halvorson, EG. David Williams Cheever: The First Esophagotomy in America.

Halvorson, EG, and McClellan, WT. Notes from Underground – How to Pass the Written Board Exam in Plastic Surgery.

MEETINGS ATTENDED

Southeastern Society of Plastic and Reconstructive Surgeons Breast Surgery Symposium, Atlanta, GA, January 2008

Annual Meeting of the American Society for Reconstructive Microsurgery, Los Angeles, CA, January 2008

Annual Meeting of the American Society of Plastic Surgeons, Baltimore, MD, October 2007

Annual Meeting of the American Head & Neck Society, San Diego, CA, April 2007.

Annual Meeting of the American Society for Reconstructive Microsurgery, Puerto Rico, January 2007

Annual Meeting of the Northeastern Society of Plastic Surgeons, Boston, MA, December 2006

Annual Meeting of the American Society for Reconstructive Microsurgery, Tucson, AZ, January 2006

Annual Meeting of the Northeastern Society of Plastic Surgeons, Washington, DC, November 2005

Annual Meeting of the American Society of Plastic Surgeons, Chicago, IL, September 2005

Annual Meeting of the New England Society of Plastic and Reconstructive Surgeons, Mystic, CT, June 2005

Lahey Clinic Post-Graduation Recognition Day, Burlington, MA, June 2005

ASPS/PSEF Senior Residents Conference, Houston, TX, March 2005

AO/ASIF Principles of Operative Treatment of Craniomaxillofacial Trauma and Reconstruction, Boston, MA, March 2005

Annual Meeting of the American Society of Plastic Surgeons, Philadelphia, PA, October 2004

Annual Clinical Congress of the American College of Surgeons, San Francisco, CA, October 2003

Annual Meeting of the American Academy of Pediatrics, Washington, DC, October 1999

DIVISION RESPONSIBILITIES

Responsible for organizing weekly Plastic Surgery Grand Rounds, including Indications Conference, Morbidity & Mortality Conference, and invited speakers.

Responsible for organizing weekly conference covering Selected Readings in Plastic Surgery.

Developed standardized preoperative, intraoperative, and postoperative care for all patients undergoing microsurgical reconstruction, and developed "Microsurgery Handbook" for residents.

Developing databases for outcomes studies: Head & Neck and Breast.

EDUCATIONAL LECTURES

"Non-Melanoma Skin Cancers and Skin/Soft Tissue Reconstruction" – Lecture for 3rd-year medical students – UNC – 8/2/07, 11/29/07

"Breast Reconstruction" – Lecture for 3rd-year medical students – UNC – 5/22/07

"Cheever's 'Double Operation': The First Le Fort I Osteotomy" – Plastic Surgery Grand Rounds – UNC – 4/20/07

"Perforator Flaps and Microsurgery" – Grand Rounds, Department of Surgery – UNC – 1/31/07

"Surgical Flaps" – Lecture for 3rd-year medical students – UNC – 9/27/06, 11/22/06, 1/29/07

"Wound Healing/Non-Healing Wounds" – Lecture for 3rd-year medical students – UNC – 4/2/07, 7/30/07, 9/24/07, 8/4/08

"The Versatile ALT Flap" – Plastic Surgery Grand Rounds – UNC – 10/27/06

"Open vs Laparoscopic Herniorrhaphy" - Grand Rounds, Department of Surgery - Brown University – 4/03

BASIC SCIENCE RESEARCH

Studied the role of Substance-P and its receptor in mediating gastrointestinal inflammation, as well as the kinetics of Substance-P receptor desensitization. Laboratory of Steven R. Vigna, Ph.D., Dept of Gastroenterology and Cell Biology, Duke University Medical Center, September, 1996 - May, 1997.

ADVOCACY, OUTREACH, & EMPLOYMENT

American Society of Plastic Surgeons Southeast Advocacy Event, Washington, DC, September 2007. Met with members of Senate and Congress to lobby for CARES act, Medicaid/Medicare reform, broadening the scope of ambulatory surgical care, malpractice law reform, and funding for trauma systems.

Volunteer plastic surgeon for SALFA, Madagascar, August 2006. Spent one month divided between two mission hospitals (Antsirabe and Manambaro), assisting with burn care, wound care, and cleft care.

North Carolina Student Rural Health Coalition – organized Annual Health Fair in Fremont, NC, Spring 1997.

Durham Shelter for the Homeless – Volunteer in Student Health Clinic, Spring 1997.

Certified ACLS Instructor, Duke University Medical Center, February 1997.

Cancer Patient Support Program – Volunteer, Duke University Medical Center, Fall 1994 – Summer 1995.

MCAT Instructor, Princeton Review, Saddle Brook, NJ, January-April, 1994.

TRAVEL

France, Belgium, Holland, Spain, Portugal, England, Ireland, Italy, Switzerland, Austria, Czech Republic, Slovakia, Croatia, Greece, Belize, Mexico, Brazil, Canada, Madagascar, Kenya, India, Nepal, Thailand.

LANGUAGES

Native fluency in French.
Working knowledge of Spanish and Portuguese.

Sonal Pandya, M.D.

8 Whittier Place Apt # 2K · Boston, MA 02114
Phone 781 372–7073 · e-mail sonal.n.pandya@lahey.org

CURRENT APPOINTMENT

2002- Staff Physician, Department of Plastic and Reconstructive Surgery, Lahey Clinic, Burlington, MA

2006- Co-Director Lahey Lexington Center for Cosmetic and Laser Surgery, Lahey Clinic, Burlington, MA

POSTDOCTORAL TRAINING

1999-2001: Residency in Plastic Surgery
Lahey Clinic, Burlington, MA (with rotations at Brigham Hospital, Childrens Hospital; and Maine Medical Center)

1994-1999: Residency in General Surgery
Lahey Clinic, Burlington, MA

1993-1994: Residency in General Surgery (Preliminary)
Massachusetts General Hospital, Harvard Medical School, Boston

1992-1993: Internship in General Surgery: Bombay University
Seth GS Medical College, KEM Hospital, Bombay

EDUCATION

1986-1992: Medical School: MBBS: Bombay University (1986-91)
Rotating Internship (Post Degree Training) (1991-92)
TN Medical College, BYL Nair Hospital, Bombay

1984-1986: Junior College/Premedical School
Jaihind College, Bombay

LICENSURE, CERTIFICATION, QUALIFYING EXAMINATIONS

2003: Certification in American Board of Plastic Surgery

2001: Certification in American Board of General Surgery

1993: Massachusetts License Registration (Permanent)

1993: FLEX (Pennsylvania): Parts I and II

1992: MBBS: Bombay University

1992: FMGEMS: Parts I, II and English Test

MEMBERSHIPS

2006 - Member, American Society of Plastic Surgery
2005 - Candidate Member, American Society of Aesthetic Surgery

AWARDS AND HONORS

1990 - Distinction in General Surgery, Bombay University

1987 - Distinction in Biochemistry, Bombay University

1986 -1991 - First Class (Honors) Ist, IInd and IIIrd MBBS Board Examinations

PUBLICATIONS/PRESENTATIONS

Original Reports

- Sati SA, Pandya SP. Should a Panniculectomy/Abdominoplasty after massive weight loss be covered by Insurance. Accepted Ann Plast Surg 2008 May

- Halvorson, EG, Husni, NR, Pandya SN, Seckel BR. Optimal parameters for marking upper blepharoplasty incisions—a 10 year experience. Ann Plast Surg 2006 May; 56(5): 569-72.

- Doherty ST, Pandya SN. Body Contouring after Massive weight loss. In: Plastic Surgery secrets:2nd edition (ed Weinzweig, J.), Elsevier (*in press*).

- Pandya S; Murray JJ; Coller JA; Rusin LC. Laparascopic colectomy: Indications for conversion to laparotomy. Arch Surg 1999. 134: 471-5 (lead article).

- Pandya S; Sanders L. Use of a Foley catheter in the removal of a substernal goitre. Am J Surg. 1998 175: 155-7.

- Pandya S; Lee AK; Mackarem G; Healy GA; Heatley GJ; Hughes KS. Ductal carcinoma in situ (DCIS): The impact of screening. Proc Annual Meeting Am Soc Clin Oncol 1996 15: A140.

- Mckinney P; Pandya S. The use of pubic fat as a graft for eyelid defects. Aesthetic Plastic Surgery. 1994; 18:383-5.

Presentations

- Pandya S, Bleeding complications following Body contouring after Massive Weight Loss. Patient Risk factors. Are there trends. Accepted at the 49th Annual meeting of the New England Society of Plastic Surgery, Vermont June 6-9th 2008

- Sati S; Pandya S. Should a Panniculectomy/Abdominoplasty after massive weight loss be covered by insurance? Poster presentation at the 86th Annual Meeting of the American Association of Plastic Surgeons, Coeur d'Arlene, Idaho, May 19-22, 2007.

- Sati S; Pandya S. Should a Panniculectomy/Abdominoplasty after massive weight loss be covered by insurance? Paper presentation at the Northeastern Society of Plastic Surgeons meeting, Bermuda, October 3-7 2007.

- Sati S; Pandya S. Should a Panniculectomy/Abdominoplasty after massive weight loss be covered by insurance? Poster at Lahey Clinic Post Graduate Recognition day June 3rd 2007.

- Pandya, S. Optimal parameters for marking Upper Blepharoplasty Incisions-a 10 year experience, Poster at Lahey Clinic Post graduate Recognition day, June 2005.

- Pandya, S; Halvorson, E; Husni, N; Seckel BR. Medial and lateral landmarks for Blepharoplasty. Presented at Northeastern Society of Plastic Surgeons meeting: Washington DC, 2005.

- Laparoscopic omental flap for sternal wound closure. Presentation at Senior Residents conference, Providence, RI, March 2001

- Medial and lateral landmarks for blepharoplasty. Presentation at ASAPS May 2001 (Pandya S; Seckel BR)

- Modification of proximal carpectomy: Fascial resurfacing of diseased lunate fossa. Presentation at the second annual Richard J Smith, MD residents/ fellows hand conference, MGH, Boston, MA, June 2000.

- Laparascopic colectomy: indications for conversion to laparotomy. Presentation at New England Surgical Society meeting in Toronto, ON. 1998.

- Ductal carcinoma in situ: The impact of screening on clinical presentation and pathological features: Oral presentation at the New England Cancer Society Meeting, Boston, MA 1995. (Third prize).

- Poster presentation at the American Society of Clinical Oncology Meeting (ASCO), Philadelphia, PA, 1996.

- Oral presentation at the New England Association of Gynecological Oncologists Meeting, Brewster, MA, 1997.

- The value of division of strap muscles in thyroid and parathyroid surgery-A prospective randomized trial. Oral presentation at the Tufts Medical School Annual Research Day, 1997.

- Pandya S, Dalvi A. Comparison of cholecystectomy with and without drains. Oral presentation at the National Surgical Meeting, Bombay, 1992.

Work/Research in progess

- Skin Biopsy changes in patients undergoing massive weight loss surgery-study of elastin and collagen

- A cadeveric study to assess the lower eyelid fat pad

- The role of actipath in Body Contouring studies

- Contributer to the Atlas of Body Contouring surgery –Loren Borud

FORENSIC ENGINEERING SCIENCES, INC.
A Professional Corporation of Engineering Consultants since 1990

2586 Nazareth Road
P. O. Box 3938
Easton, PA 18043-3938

Telephone: (610) 253-6336
Voicemail: (800) 407-5972
Facsimile: (610) 253-6177

August 15, 2008

Ouellette, Deganis, Gallagher & Ward, LLC
143 Main Street
Cheshire, Connecticut 06410

Attention: Sergio C. Deganis, Esq.

Re: Pearce v. Baumm, et als
Your File No. 0812.01D
Our File No. T-1596

Gentlemen:

In accordance with your request, my report and opinions follow for the above captioned matter as required by the Federal Rules of Civil Procedure. A complete set of my photographs taken during the 5/2/07, 2/11/08 & 2/12/08 inspections in this matter, including photographs of an exemplar fork component, are included as part of this report for information and general reference. In order to aid in explaining my analysis, findings and opinions at the time of trial, I intend to refer to these photographs, as well as the images recorded by Affiliated MRD, LLC, the independent metallurgical laboratory, which were previously produced to all parties on CD.

I reserve the right to supplement these findings and opinions should additional relevant information become available. Please also be advised that my time will be billed at the rate of $220 per hour for all activities. I look forward to providing you with continuing engineering support as you may require.

Sincerely,

David F. Toler

David F. Toler, P.E.
Engineering Consultant

CONTENTS

EXHIBITS

I. INTRODUCTION

This report has been prepared pursuant to Rule 26 of the Federal Rules of Civil Procedure for disclosure of expert opinions and the bases for those opinions. This matter relates to the bicycling accident that Mr. Eric Pearce experienced on 6/29/04. The injuries sustained as a result of the subject accident serve as the basis for the subject claim.

In investigating the equipment conditions that caused the subject accident and resultant injury, and formulating my opinions relating thereto, I have relied upon my education, training and experience including, but not limited to, the fields of Mechanical Engineering, Failure Analysis, Equipment Design, Properties of Materials and their Response to Loading, and Precision Casting of Machine Components. A cursory description of my professional qualifications and experience is attached as Exhibit A in the customary form of a Curriculum Vitae. My undergraduate engineering education focused on aluminum materials, including casting deficiencies in aluminum ingots, the causes of those deficiencies and the means to prevent them. During the 14 years that I worked in the jet engine and gas turbine industries, I worked on several projects that included the design of components suitable for precision casting, the qualification process for manufacturing sound components by precision casting, the acceptance/rejection criteria for such components, and the ongoing quality assurance for producing sound components. These projects involved working closely with the internal precision casting experts of Pratt & Whitney Aircraft, and vendors such as Howmet, AETC, Special Metals, Dana, Doncaster, Therm, Inco, Cabot, Allison and others. Exhibits B, C and D respectively list my trial appearances, deposition testimony and publications as required by the Federal Rules.

Selected photographs taken during the inspections of the subject bicycle and fork and the exemplar fork provided by Mr. Pearce are provided in Exhibit E. Exhibits F through J are taken from the CD provided by Affiliated MRD, LLC, containing images taken during the joint examinations conducted on 2/11/08 and 2/12/08.

Exhibit K is Chapter 5 of *Aluminum Alloy Castings, Properties, Processes, and Applications*, published in 2004 by the American Foundry Society and ASM International. Of the various references reviewed, general agreement was observed between them relating to the technology of casting aluminum. Chapter 5 of *Aluminum Alloy Castings, Properties, Processes, and Applications* appeared to represent a convenient combination of thoroughness and conciseness. Accordingly, it has been appended hereto for convenient reference. However, all of the references listed in Section IV were reviewed for this analysis and may be referred to if needed.

II STATEMENT OF OPINIONS

1. The fracture of the crown on the subject fork was not caused by the accident, or any other event in which a single overload occurred, or any unforeseeable action or inaction on the part of Mr. Pearce. Mr. Pearce was entitled to rely on the suitability of the Hot Rod Fork for use on his bicycle, especially after having received the reassurance from Mr. Baumm.

2. The subject fork failed as a result of cracks that initiated at or near the surface of the crown, at or near the location of maximum dynamic stress adjacent to the machined shoulder, on both the front and rear of the thin wall of the crown tube. These cracks propagated into and around the wall of the crown tube and ultimately resulted in the rapid final fracture and separation of the fork from the crown tube.

3. Macroporosity and microporosity present in the grain boundaries of the cast aluminum crown, at or near the location of maximum dynamic stress in the crown, served as nucleation sites for initial cracks. The joining of theses initial cracks and propagation of the cracks into and around the crown tube formed the initial fractures at the front and rear of the crown tube that were subject to corrosion and reached critical size prior to the accident. The presence of macroporosity and microporosity on the grain boundaries of the material significantly reduced the magnitude of dynamic stress at which the cracks initiated and propagated in the cast aluminum crown. The crown tube was rendered susceptible to the rapid final fracture, and the resultant separation of the fork from the crown tube, by the shrinkage/gas porosities that existed in the crown tube and the inordinate brittleness of the material as indicated by its measured hardness and the absence of deformation.

4. The level of macroporosity and microporosity present in the critical location in the subject crown rendered it unsuitable for its normal, foreseeable use, and constituted a defectively manufactured product. The defectively cast crown was the cause of the injuries to Mr. Pearce. Had the crown been manufactured in a manner that was capable of delivering the strength listed in reference handbooks for cast aluminum alloy 356, heat treated to T-6 condition, it is most probable that foreseeable users, including Mr. Pearce, would have realized an indefinite life for the Hot Rod Fork.

5. The casting suppliers acted inappropriately and with disregard for the safety of the ultimate users by failing to provide to the purchaser a proper plan and procedure for assuring the soundness of the castings they made, or sufficient information about the costs and difficulties of such a project to permit the purchaser to choose to undertake that project or revert to the wrought material that had been successfully used.

III BACKGROUND

On 12/15/99, Mr. Eric Pearce purchased an Aegis Trident Frame and Hot Rod Fork, manufactured by Advanced Composite Engineering, for a bicycle he was assembling. On 7/26/00, he also purchased a Tommasini Sintesi bicycle. Reportedly, Mr. Pearce liked the ride of the Hot Rod Fork on the Trident bicycle, so on 3/12/01, he purchased another Aegis Hot Rod Fork with paint to match his Tommasini bicycle. He installed the Hot Rod Fork on his Tommasini bicycle and used it until June of 2002. As a result of reports of failures he heard from other cyclists, Mr. Pearce began an e-mail exchange with Mr. Keith Baumm, President of Advanced Composite Engineering (Advanced). He returned his Hot Rod Fork to Advanced for examination and evaluation. The fork was returned to him with a representation from Mr. Baumm that there was not a history of failures with this model fork, and it was determined by inspection that the underlying structure of the fork was fine, and a critical dimension was good. Mr. Pearce re-installed the fork in his Tommasini bicycle approximately in the fall of 2002. On June 29th, 2004, Mr. Pearce was riding the Tommasini bicycle with the Hot Rod Fork on a stretch of road in Billerica, Connecticut, that was rough from multiple patches of the bituminous concrete (a.k.a. asphalt) travel surface. As Mr. Pearce described the accident during his 4/25/08 deposition, he was traveling over the rough road when he heard a loud snap and there was an instantaneous impact of his face on the road. The injuries sustained as a result serve as the basis for the subject claim.

Advanced Composite Engineering (Advanced) manufactured the Hot Rod Forks by utilizing an aluminum crown at the top of the fork, where the steerer tube joined the fork. The crown was manufactured with carbon composite fork tubes, with aluminum dropouts for mounting the front axle. A carbon composite steerer tube was bonded to the top feature of the crown, hereafter referred to as the crown tube. Advertising literature for the Hot Rod Fork stated that the crown was manufactured out of [wrought] 6061-T-6 aluminum alloy. Through discovery, it was learned that for several years before Mr. Pearce purchase the Hot Rod Fork on 3/12/01, Advanced also manufactured Hot Rod Forks utilizing precision cast crowns manufactured from alloy 356 by Wyman-Gordon Investment Castings, Inc., and Sturm, Ruger & Co., Inc. Apparently, no means has been identified to determine which supplier provided the cast crown in the weeks or months prior to 3/12/01 that ultimately was used by Advanced to manufacture the Hot Rod Fork delivered to Mr. Pearce.

IV MATERIAL REVIEWED

1. Pleadings
2. FRCP Section 26 Report & Proof of Claims
3. Police/Ambulance Report
4. 7/25/06 Report by John Allen
5. E-mail correspondence between Pearce & Baumm
6. Invoices for the purchases of bicycle components
7. Bicycle History, Medical Providers & Timeline Prepared by Mr. Pearce
8. Baumm's Answers to Interrogatories and Request for Production
9. Wyman-Gordon Answers to Interrogatories and Request for Production
10. Uni-Cast Answers to Interrogatories and Request for Production
11. Document production by Sturm-Ruger & Co.
12. Document production by Wyman-Gordon
13. Deposition testimony of Eric Pearce, Keith Baumm, John Desjardins, Dean Duplessis, Wendy Clattenburg and Benedict Rampulla, Jr.
14. Documents marked as deposition exhibits
15. Photographs produced in discovery
16. *Aluminum, Volume III, Fabrication and Finishing*, Aluminum Company of America, American Society for Metals, 1967
17. *Fundamentals of Metal Casting Technology*, Dr. P.C. Mukherjee, Oxford & IBH Publishing Co. Pvt. Ltd., 1988.
18. *Metallurgical Failure Analysis*, Brooks & Choudhury, McGraw-Hill, Inc., 1993.
19. *Metals Handbook, Desk Edition, Second Edition*, ASM International, 1998.
20. *Aluminum Alloy Castings, Properties, Processes, and Applications*, American Foundry Society, ASM International, 2004

V INSPECTION ACTIVITIES

On 5/2/07, nondestructive examinations of the subject bicycle, the fractured fork, and an exemplar fork were conducted at the facilities of Affiliated MRD, LLC, at 777 New Durham Road, Edison, New Jersey. The bicycle was identified as constructed on a Tommasini Sintesi frame with components by Ultegra and an Aegis Hot Rod Fork (Exhibit E, Photos 008 & 101). It was evident from the machined mounting pad for the brake caliper and the top shoulder of the fork on the exemplar Aegis Hot Rod Fork that the upper portion of the fork, the Crown, was manufactured from aluminum (Exhibit E, Photos 066 & 073). The top aspect of the Crown was manufactured with a cylindrical feature, hereafter referred to as the Crown Tube, to accept the carbon composite tube that served as the steerer tube. The crown tube was machined over its full length, with the lower portion slightly larger in diameter to accommodate the inner race of the lower headset bearing. The crown tube machining terminated with a shoulder, and the fillet radius between the cylindrical form and the shoulder was small, apparently corresponding to the typical point radius of 0.005 inch for common single-point turning tools.

Examination of the fractured Hot Rod Fork revealed that the crown was manufactured from cast aluminum. The fracture had occurred through the crown tube adjacent to the shoulder (Exhibit E, Photos 022 & 062). A small crescent-shaped area of the fracture surface at the front of the fork exhibited a corrosion product that was white in appearance. A larger crescent-shaped area at the rear of the fracture surface exhibited corrosion products that were mostly reddish in appearance. On the exemplar fork, it was evident that the carbon composite steerer tube was bonded to the upper end of the crown tube. More details of construction were visible in the fractured fork, including the fact that the steerer tube extended well down inside the crown to the point where the mounting bolt for the front brake caliper passed through the bottom end of the steerer tube. However, the steerer tube was not bonded to the inside of the crown in that region of engagement.

During the 5/2/07 examination, the front brake cable was disconnected from the front caliper (mounted on the front fork) in order to make it more feasible to repackage the bicycle and fork in a manner that would protect the fracture surfaces from incidental contact. At the conclusion of the examination, the evidence was maintained in your possession. As a result of the initial inspection, a protocol was formulated for the destructive examination of the fork crown, and issued on or about 1/25/08.

On 2/11/08 and 2/12/08, a destructive examination was conducted in accordance with the published protocol. The steerer tube was removed from the headset to facilitate optical inspection. The previously described areas of corrosion on the fracture surface of the fork were observed to be mirrored on the fracture surface of the remnant of the crown tube that remained attached to the steerer tube (Exhibit E, Photo 145). Following an initial cleaning of the fracture

surface on the fork, the crescent area at the back of the fork was visible where the corrosion products had been removed (Exhibit E, 152). A section of the crown at the very top of the fork was cut from the fork to separate the fracture surface. Another piece was cut from the aluminum crown for use in determining the alloy chemistry.

Optical microscopy on the crown tube fracture surface confirmed the presence of the reddish corrosion products at the rear and the white corrosion products at the front of the fracture (Exhibit F, Photos 010 & 003). Macroporosity open to the fracture surface was observed to be randomly distributed on the fracture surface (Exhibit F, Photos 008 & 006).

Following an initial cleaning of the fracture surface, examination in the scanning electron microscope (SEM) revealed that corrosion deposits remained on the front and rear edges (Exhibit G, Photo 16 typical). The corrosion products at the rear of the fracture surface consisted largely of iron and oxygen, or rust (Exhibit G, Figure 002-1). Shrinkage and gas porosities that were open to the fracture surface were examined and photographed (Exhibit G, Photos 009 – 014 typical) . Evidence of non-metallic inclusions was also observed at many locations (Exhibit G, Photos 006 & 007 typical). The SEM examination revealed that most of the fracture, outside of the areas of initial cracking, was transgranular in nature, as is common with the fracture of brittle cast aluminum components (Exhibit G, Photos 006 – 010 & 014 – 016). There were no visible striations or beachmarks of the type normally produced by a fatigue type transgranular fracture. There was no evidence of ductile deformation or microvoid coalescence of the type normally associated with an overload fracture in a ductile material.

Specimens were cut from the rear of the fractured crown at locations intersecting an area of origin of the initial cracks. These specimens were prepared by standard metallographic techniques. In the as-polished, un-etched condition, the SEM examination revealed shrinkage and gas porosities open to the fracture surface and within the body of material (Exhibit G, Photos 028 & 030 respectively). After the specimens were etched to reveal the grain structure of the material, numerous small pores (microporosities) were revealed to be randomly distributed along the grain boundaries of the aluminum matrix and at the interface of the silicon precipitate (Exhibit G, Photos 031 – 033 typical). Additional shrinkage/gas porosities open to the fracture surface were also documented (Exhibit G, Photo 032).

Metallographic examination of the un-etched specimens revealed that microporosity was randomly distributed throughout the material (Exhibit H, Photo 001 typical). Macroporosity was also evident at the fracture surface (Exhibit H, Photos 002 & 004). After etching, the microporosity was observed to be randomly distributed along the grain boundaries of the aluminum matrix and at the interface of the silicon precipitate (Exhibit H, Photos 005 – 007 typical).

Material hardness was measured on the surface of the polished microspecimens using a Vickers indenter and a load of 100 grams. The hardness measurement averaged 141 (Exhibit I), which converts to 75 HRB. The material was identified by Direct Reading Atom Emissions Spectroscopy as having a chemical composition consistent with UNS A03560 (aluminum alloy 356) (Exhibit J).

VI BASES AND REASONS FOR OPINIONS

1. Examination of the front tire and wheel of the involved bicycle revealed no evidence of impact or collision damage. Similarly, inspection of the fork tubes revealed no evidence of an overload event. Examination of the fracture surface revealed that cracking had initiated at or near the surface of the crown tube, adjacent to the machined shoulder, and propagated over time into and around the thin wall of the crown tube. Accordingly, the fracture of the crown on the subject fork was not caused by the accident, or any other event in which a single overload occurred. In addition, there is no evidence that any unforeseeable action or inaction on the part of Mr. Pearce caused the crown tube to fracture. Clearly, such a safety critical component of a bicycle should have been designed and manufactured for an indefinite life under foreseeable conditions of use. Accordingly, Mr. Pearce was entitled to rely on the suitability of the Hot Rod Fork for use on his bicycle, especially after having received the reassurance from Mr. Baumm.

2. Visual examination of the crown fracture surface revealed a variation of color and corrosion on both the front and rear edges of the fracture surface. Such a pattern could reasonably exist only as a result of the differential time of exposure of those areas to environmental effects as the initial cracks propagated over time into and around the crown tube from initiation sites at or near the exterior surfaces of the crown tube. The variation in color and corrosion level was confirmed by optical microscopy. The presence of corrosion products in these areas showed that cracks existed at these locations prior to the final fracture that resulted in the subject accident. Casting porosity (macro porosity) was also visible at the low magnifications available for use in the optical examination. Following an initial cleaning of the fracture surface, scanning electron microscopy revealed that corrosion deposits remained on the front and rear edges. Shrinkage and gas porosities that were open to the fracture surface were examined and photographed. The SEM examination revealed that most of the fracture, outside of the areas of initial cracking, was transgranular in nature, as is common with the fracture of brittle cast aluminum components. There were no visible striations or beachmarks of the type normally produced by a fatigue type transgranular fracture. There was no evidence of ductile deformation or microvoid coalescence of the type normally associated with an overload fracture in a ductile material. These observations indicated that most of the fracture occurred in a rapid, brittle manner at the moment of the fork separation that caused the subject accident.

   During the normal, foreseeable use of a bicycle, dynamic loading from road irregularities creates dynamic bending loads of varying magnitude in the longitudinal direction of the front wheel, with the rear of the crown tube being subjected to the largest tensile stress cycles. The front of the crown tube experiences the largest tensile stresses as the front

wheel encounters obstructions (such as exiting a pot hole) and during the use of the front wheel brake. The subject fork failed as a result of cracks that initiated at or near the surface of the crown, at or near the location of maximum dynamic stress adjacent to the machined shoulder, on both the front and rear of the thin wall of the crown tube. These cracks propagated into and around the wall of the crown tube and ultimately resulted in the rapid final fracture and separation of the fork from the crown tube.

3. Specimens were cut from the fractured crown at locations intersecting an area of origin of the initial cracks. These specimens were prepared by standard metallographic techniques, and were examined in the as-polished, un-etched condition, as well as after being etched to reveal the grain structure of the material. Shrinkage/gas porosities open to the fracture surface were present, and numerous small pores (microporosity) were randomly distributed along the grain boundaries of the aluminum matrix and at the interface of the silicon precipitate. It is well known in the aluminum industry and the failure analysis community that such porosity adversely affects the ability of the aluminum alloy to resist both static and dynamic loading. When subjected to dynamic loading, the porosity serves as the initiation sites for cracks, largely as a result of the stress concentration effects caused by the individual pores. Shrinkage/gas porosities had been observed via optical microscopy to exist in the thin wall of the tube at many locations around the tube, with some pores open to the machined surface of the tube. Metallographic examination revealed that macroporosity and microporosity was present at or near the location of maximum dynamic stress in the crown, in the comparatively thin wall of the tube adjacent to the shoulder of the crown.

As the location of the lower bearing of the headset, the location of the maximum bending moment on the crown tube from dynamic loading on the fork occurred in the crown tube adjacent to the machined shoulder. In addition, the minimum cross section of material existed at that location, so the maximum stresses that existed in the fork occurred at that location. As a result, the macroporosity and microporosity present in the grain boundaries of the cast aluminum crown, at or near the location of maximum dynamic stress in the crown, served as nucleation sites for initial cracks. The joining of theses initial cracks and propagation of the cracks into and around the crown tube formed the initial fractures at the front and rear of the crown tube that were subject to corrosion and reached critical size prior to the accident. The presence of macroporosity and microporosity on the grain boundaries of the material and other casting defects (e.g. shrinkage and non-metallic inclusions) significantly reduced the magnitude of dynamic stress at which the cracks initiated and propagated in the cast aluminum crown. The crown tube was rendered susceptible to the rapid final fracture, and the resultant separation of the fork from the crown tube, by the shrinkage/gas porosities that existed in

the crown tube and the inordinate brittleness of the material as indicated by its measured hardness and the absence of deformation.

4. The level of macroporosity and microporosity present in the critical location in the subject crown rendered it unsuitable for its normal, foreseeable use, and constituted a defectively manufactured product. Methods commonly utilized to control macroporosity and microporosity to a level having a negligible effect on the mechanical properties of the cast component were widely known in the aluminum casting industry. These included, in part, controlling the numerous factors that result in water, moisture or elemental hydrogen entering the material stream leading up to the molten aluminum solidifying inside the mold, and limiting the maximum temperature of the melt to minimize the ability of the molten aluminum to hold hydrogen in solution. Other techniques also widely known in the aluminum casting industry could be specifically tailored for the component of interest. These included, in part, controlled and/or directional cooling such that hydrogen in solution is "pushed ahead" of the solidification to a location were the formation of porosity would not be detrimental to the mechanical properties of the component, or a location where the material containing the porosity would be removed from the finished component. These procedures were not adequately performed for the casting that came to be used to make the fork that failed during use by Mr. Pearce, and the defectively cast crown was the cause of his injuries. Had the crown been manufactured in a manner that was capable of delivering the strength listed in reference handbooks for cast aluminum alloy 356 heat treated to T-6 condition, it is most probable that foreseeable users, including Mr. Pearce, would have realized an indefinite life for the Hot Rod Fork.

5. The type of casting process that could reliably produce components with negligible levels of porosity at the critical location in the crown could be reasonably developed only in concert with initial and repeated metallurgical analyses of sample parts as the process was developed and fine tuned. Upon demonstrating with metallurgical analyses that the developed process was repeatedly capable of producing sound components with acceptable levels of porosity, rigorous adherence to the parameters of the developed process would be required to ensure that production components were similar in metallurgical quality to the samples that had been subjected to metallurgical evaluation. This process was not performed for the components manufactured by the casting vendors for Advanced Composite Engineering. The reviewed correspondence and deposition testimony indicated a lack of knowledge and understanding on the part of the purchaser as to what was required to reliably produce sound castings of a quality sufficient to manufacture a safe product. The reviewed correspondence and deposition testimony also indicated that the casting vendors failed to adequately educated the purchaser regarding the methodology to develop a casting process that was capable of producing sound castings of a quality sufficient to manufacture a safe product. The correspondence of the

casting suppliers reflected a willingness to manufacture a component to minimal requirements, primarily dimensional in nature, while discounting the potential consequences of supplying castings that were subject to failure from preventable unsound conditions. Further, the correspondence of both casting suppliers indicated an unhelpful attitude when the purchaser expressed concern for the soundness of the castings and the safety of the ultimate users. A proper solution to the problem of assuring sound castings should have been presented to the purchaser. If that solution had proven too expensive to be a viable alternative to the prior design which was machined from wrought 6061-T6 aluminum alloy, then a return to that material would have been the appropriate solution. The casting suppliers acted inappropriately and with disregard for the safety of the ultimate users by failing to provide to the purchaser a proper plan and procedure for assuring the soundness of the castings they made, or sufficient information about the costs and difficulties of such a project to permit the purchaser to choose to undertake that project or revert to the wrought material that had been successfully used.